

# Memorandum

March 13, 2023

To: Hunter Young, U.S. Environmental Protection Agency  
Wesley Thomas, Oregon Department of Environmental Quality

From: Ryan Barth, Anchor QEA, LLC, and Rob Ede, Hahn and Associates, Inc.

cc: Bob Wyatt, NW Natural  
Patty Dost, Pearl Legal Group  
Mike Crystal, Gary Rose, and Chris Ryan, Severson Environmental Services Inc.  
Billie-Jo Gauley, Joe Smith, and Jen Mott, Anchor QEA, LLC  
Lance Peterson, CDM Smith

**Re: Revised In Situ Stabilization and Solidification Bench Scale Treatability Study  
Work Plan Addendum**

The U.S. Environmental Protection Agency's (EPA's) January 18, 2023, comments requested that NW Natural consider provisions of the EPA guidance for conducting a treatability study pertaining to the projected costs for the study (EPA 2023). Consistent with the guidance, NW Natural has continued to evaluate ways to improve the cost effectiveness of the proposed treatability study, including how "cost and time savings" could be "increased by limiting sampling and analysis objectives to address only indicator contaminants" (EPA 1992). This memorandum recommends two revisions to the *Revised In Situ Stabilization and Solidification Bench Scale Treatability Study Work Plan* (Revised Work Plan) submitted to EPA and Oregon Department of Environmental Quality (DEQ) on February 16, 2023.

One revision is to the Phase IV sediment laboratory testing program. The other revision is to the Phase IV soil laboratory testing program. Details are provided as follows:

**1. Revised Phase IV Sediment Laboratory Testing Program**

The Phase IV sediment laboratory testing would be revised to focus on the analysis of treated sediment samples for the subset of contaminants of concern (COCs) required to support design and assure evaluation of remedial effectiveness. The Phase IV testing of untreated sediment samples is not necessary to support remedial design. Empirical data (instead of modeling using the results of the Phase IV testing) will be collected during the field pilot study NW Natural is hoping to implement this summer to confirm the remedy is protective for the remainder of the *Record of Decision – Portland Harbor Superfund Site, Portland, Oregon* (ROD; EPA 2017) Table 17 COCs with groundwater cleanup levels (CULs; pesticides, polychlorinated biphenyls [PCBs], perchlorate, and herbicides). Specific analytes for the Phase IV testing of treated sediment samples include the following:

- Polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs) consistent with the initial proposed scope based on the EPA-approved findings in the *Final*

*Pre-Remedial Basis of Design Technical Evaluations Work Plan* (Anchor QEA 2019) regarding these chemical migration driver COCs

- Increase the metals analytical list from arsenic only to the full suite of metals with ROD Table 17 groundwater CULs to provide empirical data to address EPA General Comment 3 (EPA 2023) and DEQ General Comment 6 (DEQ 2023) on the Revised Work Plan (see Appendix E of the Revised Work Plan) regarding potential changes in metals contaminant transport and leachability caused by application of in situ stabilization and solidification (ISS)
- Cyanide to document the leachability under changes in pH caused by application of ISS
- Total organic carbon, dissolved organic carbon, pH, oxidation reduction potential, and specific conductivity to support further evaluation of the treatability study leachability data

These modifications will provide all data needed to support remedial design and assure remedial effectiveness of the ISS technology at significantly less cost. Analytical costs for Phase IV testing were received shortly after the Revised Work Plan was submitted. The proposed revision will eliminate approximately \$600,000 in laboratory costs without reducing the effectiveness of the treatability study or altering its objectives. The NW Natural Design Team has determined this approach will more accurately and cost-effectively demonstrate protectiveness for potential migration (if any) of these COCs following ISS sediment treatment. The details of the empirical monitoring program will be discussed with EPA and described in the forthcoming *In Situ Stabilization and Solidification Field Pilot Study Work Plan*.

## **2. Phase IV Soil Laboratory Testing Program Is Unnecessary and Should Be Eliminated**

Similarly, based on laboratory cost estimates received after submittal of the Revised Work Plan, the NW Natural Design Team re-evaluated the need for treated and untreated Phase IV soil laboratory testing and determined that program element to be unnecessary. The proposed soil laboratory testing program still includes sample collection from the five top-of-riverbank soil sampling locations. Samples collected from these locations will still undergo Phase I and Phase II laboratory testing to determine the optimum grout composition and dosage relative to achieving design criteria (i.e., strength, permeability, swell, and constructability parameters). These samples will also still undergo the Phase III leachability testing for both untreated and treated soil samples.

The NW Natural Design Team believes that the Phase III soil laboratory testing data achieve DEQ's request for estimation of contaminant mass flux potential and evaluation of long-term barrier wall effectiveness and protectiveness. In particular, the Phase III data will allow an estimation of the reduction in diffusive mass flux by proportionality (i.e., by comparing leachate concentrations in treated versus untreated samples). This phase of testing will further be supported by the expansion of hydrogeologic characteristic testing for soils to include the hydrometer method of particle size analysis to quantitatively determine clay content.

Unlike ISS in subaqueous sediments, the ISS treatment barrier wall remedial design does not require analysis of soil leachate concentrations to estimate the reduction in diffusive mass flux in ISS-treated soils over time. It is also important to note that the original ISS design concept included utilization of auger columns to install the deep upland ISS treatment barrier wall. Based on additional detailed technology evaluations and discussions with equipment manufacturers, the auger approach for wall construction has been replaced with the DeWind OnePass Trenching system. This system creates the ISS treatment barrier wall by mixing the entire depth profile of soil and contaminants so vertical variations in geology and contaminant conditions are no longer relevant with regard to post-construction wall consistency. To prepare representative composite samples, the soil samples will be created by collecting material equally from across the full length of the soil borings; this is a slight modification from the approach presented in the Field Sampling Plan (Appendix A of the Revised Work Plan), which proposed generating the composite samples from homogenizing discrete samples collected from 10-foot depth intervals.

Based on the determination that the expanded Phase III testing will provide the data needed to support remedial design, Phase IV soil laboratory testing is not required. Removing Phase IV soil laboratory testing from the study also reduces the cost significantly (approximately \$1,000,000) in recognition of EPA's criterion for treatability study cost effectiveness.

## References

- Anchor QEA (Anchor QEA, LLC), 2019. *Final Pre-Remedial Basis of Design Technical Evaluations Work Plan*. Prepared for the U.S. Environmental Protection Agency. Prepared on behalf of NW Natural. August 29, 2019.
- DEQ (Oregon Department of Environmental Quality), 2023. Letter to: Bob Wyatt, NW Natural. Regarding: DEQ Comments on the In-Situ Stabilization and Solidification Laboratory Pilot Study Work Plan. Former Gasco Manufactured Gas Plant Operable Unit, Portland, Oregon. ECSI #84, ECSI #183. January 18, 2023.
- EPA (U.S. Environmental Protection Agency), 1992. *Guidance for Conducting Treatability Studies Under CERCLA*. October 1992.
- EPA, 2017. *Record of Decision – Portland Harbor Superfund Site, Portland, Oregon*. U.S. Environmental Protection Agency Region 10. January 2017.
- EPA, 2023. *EPA Comments on In Situ Stabilization and Solidification Laboratory Pilot Study Work Plan, Gasco Sediments Site, Dated October 31, 2022*. Comments dated January 18, 2023.